LISTING OF CLAIMS:

Claim 1 (Currently Amended): An information input processing computer system for mapping gestures to keys of ~~a virtual~~ an invisible virtual keyboard, the system comprising one or several cameras, one or more memories with CPU connected to the cameras, and processes running in the CPU that associate gesture movements made without touching any touch sensors with typing and produce gesture associated textual output, wherein said processes capture gesture images, classify ~~each type of~~ the gesture ~~image~~ images into ~~a respective one of a plurality of~~ classes, ~~depending on the type of gesture, and~~ associate each of the classes with one or more possible keys of the invisible keyboard, ~~assign a probability to each of said possible keys~~ for each of said classes, assign a probability to each of the possible keys associated with the class, and integrate the probabilities assigned to the possible keys to identify a word for a sequence of gestures.

Claim 2 (Original): The gesture-key mapping system as in claim 1, where a feedback is provided to the user on what kind of keys are associated with the user's gestures.

Claim 3 (Original): The gesture-key mapping system as in claim 2, where the feedback is provided using one or more of the following: displaying keys on a display, playing sounds labels for keys, displaying image indicators on a display, playing special sound indicators, projecting the keyboard to any surface, and displaying picture of the keyboard with user's hands.

Claim 4 (Currently Amended): An information input processing, gesture-key mapping computer system for generating text from hand gestures of a user relative to an invisible virtual keyboard,

the system comprising one or several cameras, one or more memories with CPU connected to the cameras, and processes running in the CPU that associate gesture movements with typing and produce gesture associated textual output, where the gesture-key processing is provided using the following modules:

a) a gesture capturing module that captures gestures, relative to an invisible keyboard and made without touching any touch sensors, through camera sensors;

b) a gesture classificator module that classifies ~~each type of gesture~~ the gestures into ~~a respective one of a plurality of~~ classes ~~depending on the type of gesture movements~~;

c) an associator module for associating ~~gesture~~ each of the classes ~~or sequence of gesture classes~~ with one or more possible keys of the invisible keyboard ~~and assigns a probability to each of said possible keys~~ for each of said classes, assign a probability to each of the possible keys associated with the class; and

d) an integrator module that integrates the probabilities assigned to the possible keys to identify a word for a sequence of gestures.

Claim 5 (Original): The system as in claim 4, where the integrator module includes one or more of the following:

a) language module component that estimate probabilities of word strings corresponding to key candidate sequences;

b) character frequency module that estimate probabilities of character strings corresponding key candidate sequences;

c) confusable matrix that estimate how often correct gesture classes are confusable with another gesture classes;

d) gesture classes probability model that estimate probability of observing a string of gesture classes given a sequence of gesture frames;

e) computation of a probability of production a sequence of keys given a string of gesture frames;

f) generation of a lattice of sequences of keys given sequence of gesture frames;

g) finding the most probable sequence of keys from the lattice of key candidate strings.

Claim 6 (Original): A system according to Claim 5, wherein each sequence of keys receives a probability score, and the sequences of keys that receive low scores are removed and are not continuing when new candidates for keys arrive.

Claim 7 (Previously Presented): A system according to Claim 4, further comprising a gesture correlator module to allow to adjust automatically the invisible keyboard to changes in the hand positions of the user, and wherein the gesture correlator module acts between the gesture classificator module and the associator module to maintain a consistent mapping of gesture classes to keys of the invisible keyboard despite said changes in the hand positions of the user.

Claim 8 (Currently Amended): The method for producing a textual output in which a user makes typing like gesture relative to ~~a virtual,~~ an invisible virtual keyboard made without touching any touch sensors and without the presence of a real keyboard and the gestures are associated with

the most probable keys that would be typed if a keyboard were presented, said method including the steps of using a computer system to map gestures made, without touching any touch sensors, to keys of the virtual keyboard, including the steps of running processes on the computer to capture gesture images, to classify ~~each type of~~ the gesture ~~image~~ images into ~~a respective one of a plurality of~~ classes, ~~depending on the type of gesture, and~~ to associate each of the classes with one or more possible keys of the invisible keyboard, ~~assign a probability to each of said possible keys~~ for each of said classes, assign a probability to each of the possible keys associated with the class, and integrate the probabilities assigned to the possible keys to identify a word for a sequence of gestures.

Claim 9 (Currently Amended): The method for producing a textual output in which a user makes typing like gestures relative to ~~a virtual,~~ an invisible virtual keyboard and without the presence of a real keyboard and the gestures are associated with the most probable keys that would be typed if a keyboard were presented, said method including the step of using a computer system to map gestures made, without touching any touch sensors, to keys of the virtual keyboard, including the step of running processes on the computer to capture gesture images, to classify ~~each type of~~ the gesture ~~image~~ images into ~~a respective one of a plurality of~~ classes, ~~depending on the type of gesture, and~~ to associate each of the classes with one or more possible keys of the invisible keyboard, ~~assign a probability to each of said possible keys~~ for each of said classes, assign a probability to each of the possible keys associated with the class, and integrate the probabilities assigned to the possible keys to identify a word for a sequence of gestures, and wherein the probability is computed using HMM.

Claim 10 (Currently Amended): A method of typing using a virtual keyboard having a multitude of virtual keys, comprising the steps:

making typing gestures relative to ~~a virtual,~~ an invisible virtual keyboard made without touching any touch sensors and without any real keyboard;

sensing the typing gestures; and

producing, from the sensed typing gestures, gesture associated textual output including the step of running processes on a computer to capture gesture images, classify ~~each type of~~ the gesture ~~image~~ images into ~~a respective one of a plurality of~~ classes, ~~depending on the type of gesture, and~~ to associate each of the classes with one or more possible keys of the invisible keyboard, ~~assign a probability to each of said possible keys~~ for each of said classes, assign a probability to each of the possible keys associated with the class, and integrate the probabilities assigned to the possible keys to identify a word for a sequence of gestures.

Claim 11 (Original): A method according to Claim 10, wherein the typing gestures are made by a person, and further comprising the steps of providing feedback to the person on texture output associated with the gestures.

Claim 12 (Original): A method according to Claim 11, wherein the step of providing feedback includes the step of displaying an image of typing keys associated with the gestures.

Claim 13 (Cancelled).

Claim 14 (Currently Amended): A method of typing using ~~a virtual~~ an invisible virtual keyboard, comprising the steps:

making typing gestures relative to ~~a virtual,~~ an invisible virtual keyboard made without touching any touch sensors and without any real keyboard;

sensing the typing gestures; and

producing, from the sensed typing gestures, gesture associated textual output: and wherein the producing step includes the steps of classifying ~~each type of gesture~~ the gestures into ~~a respective one of a plurality of~~ classes, ~~depending on the type of gesture,~~ associating each of said classes with one or more possible keys of the invisible keyboard, ~~assigning a probability to each of said possible keys~~ for each of said classes, assign a probability to each of the possible keys associated with the class, and integrating the probabilities assigned to the possible keys to identifying a word for a sequence of gestures.

Claim 15 (Original): A method according to Claim 14, wherein the producing step further includes the step of associating gesture classes with individual typing keys.

Claim 16 (Previously Presented): A method according to Claim 14, further comprising providing training data in words or sentences with certain timing data.

Claim 17 (Currently Amended): A typing system using ~~a virtual,~~ an invisible keyboard, comprising

means for sensing typing gestures made relative to ~~a virtual,~~ an invisible virtual keyboard made without touching any touch sensors and without any real keyboard; and

means for producing, from the sensed typing gestures, gesture associated textual output said producing means including a computer and processes running on the computer to capture gesture images, to classify ~~each type of gesture image~~ the gesture images into ~~a respective one of a plurality of~~ classes, ~~depending on the type of gesture,~~ and associate each of the classes with one or more possible keys of the invisible keyboard, ~~assign a probability to each of said possible keys~~ for each of said classes, assign a probability to each of the possible keys associated with the class, and integrate the probabilities assigned to the possible keys to identify a word for a sequence of gestures.

Claim 18 (Original): A system according to Claim 17, wherein the typing gestures are made by a person, and further comprising means for providing feedback to the person on texture output associated with the gestures.

Claim 19 (Original): A system according to Claim 18, wherein the means for providing feedback includes means for displaying an image of typing keys associated with the gestures.

Claim 20 (Cancelled).

Claim 21 (Currently Amended): A typing system using ~~a virtual~~ an invisible virtual keyboard, comprising

means for sensing typing gestures made relative to a virtual, invisible keyboard made without touching any touch sensors and without any real keyboard; and

means for producing, from the sensed typing gestures, gesture associated textual output; and

wherein the producing means includes means for classifying ~~each type of gesture~~ the gestures into ~~a respective one of a plurality of~~ classes, ~~depending on the type of gesture,~~ associating each of said classes with one or more possible keys of the invisible keyboard, ~~assigning a probability to each of said possible keys~~ for each of said classes, assign a probability to each of the possible keys associated with the class, and integrating the probabilities assigned to the possible keys to identifying a word for a response of gestures.

Claim 22 (Original): A system according to Claim 21, wherein the producing means further includes means for associating gesture classes with individual typing keys.

Claim 23 (Previously Presented): A method according to Claim 10, wherein the step of running processes on the computer includes the step of mapping the sensed typing gestures to keys of the keyboard based on a statistical machine that interprets sequences of typing like gesture classes as intended words based on user typing gesture models.

Claim 24 (Previously Presented): A method according to Claim 10, wherein gesture input is represented as wave forms that are digitized and clustered in gesture frames, and then processed by HMM machines that represent difference models for different typing patterns; and the step of running processes includes the step of using two statistical components, a first statistical component to map gestures to keys, and a second, language model component to map keys to letters and words.